Remarks

The title has been amended to make editorial changes therein, bearing in mind the criticisms in the Official Action, to place the application in condition for allowance at the time of the next Official Action.

Claims 1-7 were rejected as unpatentable over HUPE et al. 5,373,629 in view of KANG et al. 6,537,411. Claim 1 has been amended and reconsideration and withdrawal of the rejection are respectfully requested.

The method defined in claim 1 consists essentially of the steps of treating a surface of a polyimide film by contact to a solution containing at least one of potassium permanganate and sodium permanganate and at least one of potassium hydroxide and sodium hydroxide and treating the surface with an acid, where the polyimide film has a biphenyltetracarboxylic acid component and a linear expansion coefficient of 5×10^{-6} to 25×10^{-6} cm/cm/°C in a temperature range of 50 to 200°C in both MD and TD, plasma treating the surface of the polyimide film after the acid treatment to improve adhesion to metals, and forming the thin metal layer on the treated side of the polyimide film by vapor deposition or a combination of vapor deposition and plating, where the polyimide film with the thin metal layer has a peel strength of not less than 0.5kg/cm even when allowed to stand under a heating at 150°C for 24 hours, when tested for a specimen having a three-metal-layer structure.

Each of the applied references has been carefully considered and their combination has been carefully evaluated. Initially, it is noted that HUPE et al. do not disclose that the polyimide film has a biphenyltetracarboxylic acid component. While HUPE et al. do disclose a polyimide film, the film does not have this acid component. HUPE et al. also do not disclose the step of plasma treating the surface of the film after the acid treatment. HUPE et al. disclose that the thin metal layer is formed by plating and do not disclose or suggest forming the thin metal layer on the treated side of the polyimide film by vapor deposition or a combination of vapor deposition and plating. It is also noted that KANG et al. disclose a method of directly laminating a metal to a polyimide in which a surface of the polyimide film is pretreated with radio frequency gas plasma. The Official Action takes the position that the suggestion in KANG et al. to use the gas plasma pretreatment can be extended to the method disclosed in HUPE et al., thereby making the invention obvious to one of skill in the art.

It is not believed that one of skill in the art would make the combination suggested in the Official Action. KANG et al. pretreat the polyimide with a plasma when the metal is being directly laminated on the polyimide. As explained at column 4, lines 44-64, the combination of the polyimide and copper is sandwiched between steel plates the subjected to pressure no less than 10 N/cm^2 in a hydraulic press. There is no suggestion in KANG et al. that the plasma pretreatment is applicable to other methods of applying the metal, such as by vapor deposition or a combination of vapor deposition and plating as claimed herein where the polyimide and metal are not subjected to the pressure disclosed in KANG et al. There is no reasonable basis to expect the results to be same for a vapor deposition method as for the direct lamination method disclosed in KANG et al.

In addition, in the process described in KANG et al. the surface of the polyimide film is modified by copolymerization. Apparently, the plasma pretreatment and copolymerization modification are related. Since HUPE et al. do not use the copolymerization technique, there is no basis for asserting that one of skill in the art would choose the plasma pretreatment from among those steps disclosed in KANG et al. and add this to the HUPE et al. method. The copolymerization of the surface further distances the technique used in KANG et al. from that disclosed in HUPE et al. so that one of skill in the art would not be motivated to use the plasma pretreatment of KANG et al. in the method disclosed in HUPE et al.

Even if one of skill in the art were to combine the references (and applicant denies that this is proper), the combination would still lack a suggestion to perform the method on a polyimide film that has a biphenyltetracarboxylic acid component and would still lack a suggestion to form the thin metal layer by vapor deposition or a combination of vapor deposition and plating. Accordingly, one of skill in the art would not find these steps in the proposed combination and therefore would not find these steps obvious.

In view of the present amendment and the foregoing remarks, it is believed that the present application has been placed in condition for allowance. Reconsideration and allowance are respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. §1.16 or under 37 C.F.R.§1.17.

Respectfully submitted,

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